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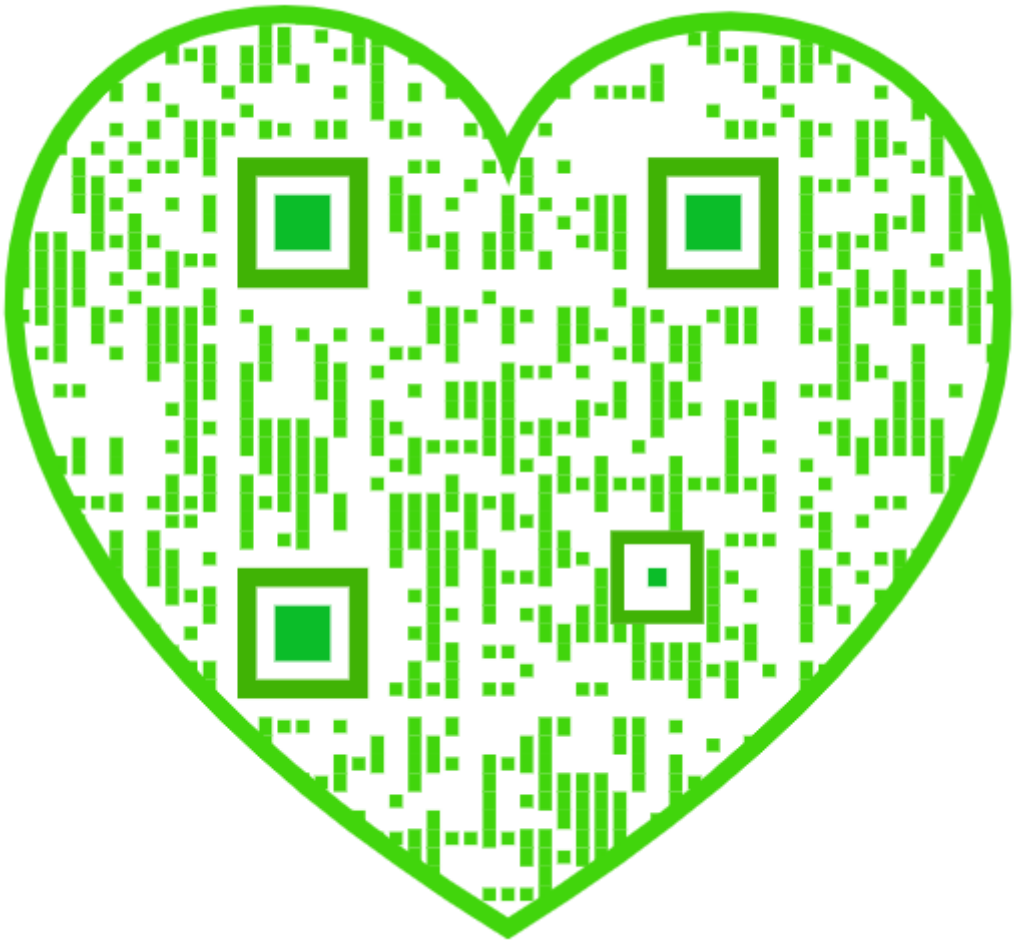
Willamette Falls Hospital

COLD WEATHER SURVIVAL

A Way of Life

by Frank Heyl with Harley Sachs



About the Authors

Frank Heyl is presently the principal instructor and director of the contact military survival training school.

Frank has authored "Staying Alive in the Arctic", a cold weather training manual used by the petroleum and pipeline companies working in Alaska and Canada. He has also supervised a Russian language edition of the manual for the training of oil field workers in Siberia.

Frank is the coauthor of the following plant identification card decks; "Edible and Poisonous Plants of the Eastern States", Edible and Poisonous Plants of the Western States" and a Survival Card Deck giving survival tips. From these three decks, the plant photography and survival tips are pictured on the U.S. Defense Mapping Agency maps for worldwide survival.

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Nobody plans to put themselves into a survival situation. Such crises are always unexpected. The purpose of this booklet is to help you survive if such a crisis occurs. In order to survive you must know what to do, when and how to do it and be able to do it in a variety of situations. The person who is in an all-out stay alive survival situation has only one goal: to survive and stay alive until rescue.

This booklet is adapted from one previously published by Willamette Falls Hospital Foundation in conjunction with the annual Cold Weather Survival and Wilderness Medicine Conference.

WHAT TO DO WHEN YOU ARE LOST

1. Avoid panic or letting such thoughts as "I've got to get out of here" cloud your judgment. While many have walked out in the past, the odds are against it. It could be the last walk you will ever attempt.

2. Think. Before attempting to walk out, ask yourself the following questions:
   - Will the weather, snow conditions, wind and visibility permit the walk? *(Usually not)*
   - Will the hours of remaining daylight permit you to reach help? *(Probably not)*
   - Is the clothing you have with you adequate for cold weather travel? *(It rarely is)*
   - Am I physically in condition for walking? *(You probably don't know)*

   If you are not positive about all those questions, stay put. A little time spent evaluating your situation and applying survival sense to the problem will go a long way in assuring your health, comfort, and safety. It may save your life.

3. Remember: When it does happen, admit you are lost. Concentrate on survival. Your goal is to stay alive until you are rescued.

YOUR SURVIVAL KITS

Be prepared before you leave home. Some items you can carry in your pockets. Others fit in a day pack. Still others can be stowed in a car, boat, or small airplane.

Keep in your pockets:

1. This survival manual and a pencil.
2. Knife: Can be used to build a fire or a shelter and make signals for rescue. There are hundreds of uses for knives, and two knives are better than one.
3. Matches: A box of Diamond Strike Anywhere brand matches is recommended. By shortening them slightly they can be kept dry in a plastic 35mm film container. Include a strip of sandpaper for a striker.
4. Fire starter: Candles are good fire starters. Rub candle wax into a 4 x 4 inch patch cut from a cotton rag or handkerchief. Wax cloth burns continuously hotter than a candle until consumed. Make up a number of wax fire starters with melted wax before you need them. Use a double boiler system (two cans: a small can for the wax and a larger can for water). Dip the cotton cloth patches in the wax and let them cool. Place patches in a plastic baggie to keep the wax from getting on clothing.
5. Local map: Study it and get a visual idea of the terrain. Look for and memorize identifiable base lines, such as a paved highway, a river, an electric power line, the ocean, etc.
6. Compass: Two compasses are better than one. Use the compass to orient the map to north.
7. Space blanket: This multi-purpose item can be used in a variety of ways: as a poncho, a shelter, a ground cloth, a wind break, a rainwater collector or a fire (heat) reflector.
8. Sun protection (includes sunglasses and sunscreen): Many of the sunglasses on the market today are designed more for style and fashion rather than for protection from the sun. Generally, glasses with dark gray-green lenses provide the best eye protection. Wrap around sunglasses protect from side glare.
9. Signal equipment (signal mirror and signal whistle):
   A) *A signal whistle* can be heard five times farther away than the human voice. Blow three sharp blasts on the whistle (Three blasts means "I need help.") and listen for an answer from the searchers, who will respond with two sharp blasts.
   B) *A signal mirror* is a daylight line-of-sight signal device that provides excellent ground-to-air signal capabilities. Read the instructions and practice signaling on a parked car (in your own driveway). Aim for the red tail light. A signal mirror can also be used to assist in the removal of foreign objects from the eyes.
10. First aid kit: *See kit list on page 5*.

Carry in your day pack:

1. All items listed in “Keep in your pockets”.
2. Clothing: Clothing protects you from the four killers: wet, wind, cold and heat. Clothing is your portable shelter. Take spare clothing such as a sweater, polypropylene long underwear and socks.
3. Extra food and water: Jelly beans are a recommended food source because they have a long shelf life, are easy to carry, provide a varied diet, are nutritious and require a minimum amount of water to digest.
4. Flashlight (waterproof): Small AA or AAA cell flashlights with a halogen bulb are recommended. After you buy the flashlight, be sure to test your flashlight by immersing it in water for at least five minutes.
5. Nylon cord: (approximately 50 feet): This can be used for shelter construction, boot laces, gear, clothing repair and much more. Parachute suspension line is recommended because there are several core lines in each suspension line and each pulls out separately. Use core lines for sewing and fish line.
6. Aluminum foil (heavy duty): Use as a surface for building a fire when the ground is very wet or covered with snow. Fold with an edge up to use as a container for boiling water or cooking.

7. A plastic leaf bag or garbage can liner: Makes a serviceable rain coat, equipment storage bag, ground cloth and water transpiration collector. *(see page 16)*
8. Water: In a large-mouth container that can be refilled with snow and thawed inside your jacket or sleeping bag.

Keep in your car, boat, or small plane:

1. All items listed in “Keep in your pockets” and “Carry in your day pack”
2. Long lasting candles, matches and a metal coffee can: A candle burning in the bottom of a coffee can will serve as a heater in a stranded automobile or in a makeshift shelter.
3. Blanket: The ideal blanket would be a wool or wool blend.
4. First Aid Kit List:
   - Water purification tablets: Titratable iodine – to purify drinking water
   - Band-Aid®: to bandage small wounds.
   - Chap-Stick®: to protect lips from wind and sun.
   - Betadine® ointment: an antiseptic/germicide to prevent infection in minor burns, cuts and abrasions.
   - Insect repellent: to prevent insect bites and stings.
   - Aspirin or Tylenol®: foil or plastic packets – for headache, fever or pain relief.

First Aid Kit (cont'd):

- Kerlix® bandage (5-yard roll): for wrapping and covering large cuts.
- Extra-fine point forceps: for removing splinters and lifting ticks.
- Antiseptic towelettes: to clean minor scrapes and scratches.
- 3M™ Steri-Strip™ Elastic Skin Closures: to close small clean cuts.
- Elastic bandage or Ace® bandage: to support sprains of the wrist, elbow, knee or ankle – also for use a pressure bandage.
- Safety pins: to make a sling or hold a bandage in place.
- Scrub soap in foil packet: for washing cuts, abrasions and any broken skin.
- Needles (sewing type): for splinter removal.
- Tape (plastic roll): to hold dressing in place.
- Combat Trauma Wrap *(see page 27):* To stop bleeding, especially in extreme cold conditions.
- Personal medication: keep in a labeled waterproof container.
- Mole skin: for foot blisters.
- Packet of cotton-tipped applicators (Q-tips®): for removal of foreign bodies from the corners of the eyes.

WHAT YOU NEED TO SURVIVE

Your survival plan includes five essential elements:

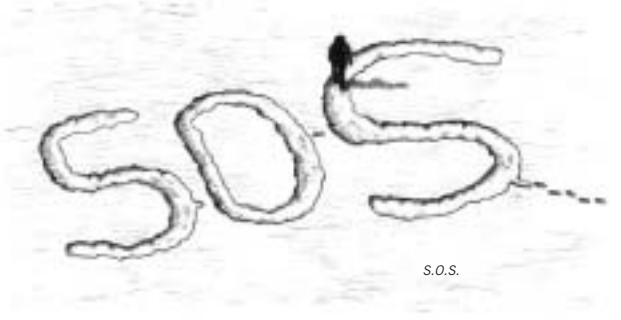
1. **Stay healthy:** To survive until you are rescued means you must be in good physical and mental health. Protect yourself from the four killers (the wet, the wind, the cold and the heat). Keep yourself well-hydrated with pure water and try to prevent injuries to yourself and others. Treat all injuries, no matter how minor, promptly. If you disregard the medical aspects of survival, your chances could be considerably reduced.

2. **Rescue Signals:** You must help people find you. Emergency signals must (1) be seen or heard and (2) convey a message.

   A) *Fires* provide warmth, comfort and will ward off cold injuries. It will also cook a meal, purify water (boil for ten minutes) and dry your socks. And, while these activities are occurring, the fire will bring searchers to you. A fire actively burning with green foliage placed on it will put up a white smoke that can be seen for several miles. Oily rags or rubber will put up black smoke, which is good in snow country, but be sure to keep the fire under control. An out-of-control wild fire can end a great survival story. A spare tire can be burned as a rescue signal. (See step-by-step fire building.)

Smoke signal

B) *An SOS* stamped out in the snow and visible from the air has accounted for several rescues in snow country. The rule of thumb with SOS letters is that they should be no less than 3 feet wide by 18 feet high.



S.O.S.

C) *Signal mirrors:* After radio communications, the signal mirror has accounted for more rescues than any other signal device. Commercial models, which are effective and have been known to send visible signals up to 20 statute miles, are available from outdoor equipment stores. A rear view mirror taken from an automobile is also effective, but is slower to use and not as accurate. It is essential to practice using the mirror, especially when using an automobile or vanity-type mirror. Time will be of the essence in signaling a fast moving aircraft. WARNING: Do not practice on aircraft in flight or on other moving vehicles. It is a federal offense to falsely signal for rescue.

Signal mirror

D) *Signal flares:* All boats and airplanes are required to carry signal flares, and highway flares are commonly carried in automobiles for emergencies. NOTE: Ground searches are only done in daylight.

3. **Keep Warm:** Humans are tropical in nature and to maintain good health, clear thinking and muscular control, you must keep warm. This is true in the desert, in the tropics, in the arctic, and in temperate regions. Whenever and wherever the temperatures are below comfortable norms, and when it is wet and windy, the body will begin to lose heat faster than it can produce it. While cold injuries are not a problem in the tropics, dampness and night cooling can seriously hamper survival efforts. The desert environment presents the problems of keeping cool during the day and warm at night. These temperature extremes can seriously menace comfort, health and survival. Temperate regions, the sub-arctic and the arctic present the problems of hypothermia, frostbite and other cold injuries. Even when protective cold weather clothing is worn, prolonged exposure to the cold and continued heat loss can cause cold injuries.

   Good health and heat from an external source will ward off cold-related problems. Heat from the sun (with clear skies) has a warming effect on the body. If you are in an automobile and have available fuel, you can use the heater for warmth during a blizzard or whiteout, but BEWARE! More people have died from carbon monoxide (the breath of death) poisoning in the cold than they have from freezing. When using your car as shelter, always open a window about one (1) inch on each side for ventilation when the engine is running. If rain or snow is blowing in the windows, close the window on the windward side and roll down the leeward side window two (2) inches.

   Keep your coat, hat, gloves and other clothing on to conserve body heat. Run the engine until the temperature in the car in comfortable and then turn it off. Start the car again only when it begins to get uncomfortably cool. Remove snow from around the tail pipe frequently. If you know about how much fuel you have, you can figure out how many hours of heat you will have. A V-8 engine will burn approximately one (1) gallon per hour at idle. A V-6 engine will burn approximately .9 gallons per hour. By running the engine for 15 minutes and turning it off for 15 minutes, you will double your comfortable heat time.

   WARNING: Do not go to sleep while the engine is running. If you do, the silent killer, carbon monoxide, will claim yet another victim. A simple heater for inside your vehicle is a slow burning candle in the bottom of a coffee can. Votive or yahrzeit candles (available in the ethnic foods section of your grocery) will burn for 24 hours.

Long before your car runs out of fuel, it is wise to consider the primitive provider of heat: ***Fire.***

Step-by-Step Fire Building

To assure success, fire building must be done step by step. Three things are required. (1) fuel, or a material for burning, (2) oxygen, a colorless, odorless gas and (3) heat, a degree of hotness. Sources for starting a fire include matches (wooden Strike Anywhere brand), a lighter, or a flint fire starter.

A. **Select a safe site.** Clear an 8' diameter circle down to mineral soil. Make sure all combustible materials are removed from this circle. Build your fire in the center of the circle. Cut away any very low hanging branches from directly over the fire site. Gather tinder. Tinder must be finely shaved or shredded to provide a low combustion point and fluffed to allow oxygen to flow freely through. Tinder includes dry grass, cedar bark, pitch, foam rubber, plastic utensils, pine needles and pine cones. To get tinder to burn hotter and longer, place the waxed cotton cloth fire starter (described in the Ten Essentials) under the tinder. Other good starters are Chapstick® and insect repellent.

B. **Gather tinder.** Tinder must be finely shaved or shredded to provide a low combustion point, and fluffed to allow oxygen to flow freely through. Tinder includes dry grass, cedar bark, pitch, foam rubber, plastic utensils, pine needles and pine cones. To get tinder to burn hotter and longer, place the waxed cotton cloth fire starter (described in the Ten Essentials) under the tinder. Other good starters are Chap-Stick® and insect repellent.

C. **Gather kindling.** Kindling must be small enough to ignite from the small flame of the fire starter and tinder. Gradually build up around tinder, teepee fashion, through the larger kindling until arriving at the size of the fuel that is to be burned.

D. **Fuel.** Continue the teepee procedure with fuel until two rows of fuel are in place. Examples of fuels include dead, dry limbs broken from trees and dry dung from plant eating animals. Consider anything that will burn. Rags soaked in engine oil can burn, too.

E. **Light the fire.** Remove a wooden Strike Anywhere match from the waterproof container. Stand with your back to the wind. Hunker down to the fire. Check to see if there is an opening at ground level in the teepee. If not, spread the fuel and kindling until you can see the waxed cloth fire starter and tinder. Strike the match and touch the flame to the fire starter. Move to the side and let the wind carry the flame through the teepee.

Fire

Sounds simple doesn't it? It is, with practice. Practice on a wet, windy, cold day. Anyone can build a fire on a dry, calm, warm day, but people usually don't get lost on calm, warm, dry days. And, if they do, they don't need a fire to stay alive.

Fire Building Tips:

- Newspaper, paper towels, Kleenex or toilet tissue are not recommended. Paper draws dampness and has a low burning temperature. It does not heat kindling well enough for good combustion.
- Build a fire on dry ground. When dry ground is not available, use aluminum foil (see Essentials list).
- When building a fire on the snow, construct a platform of wood to raise the fire off the snow.

- When two people are involved in fire building, both may do the gathering, but only one should do the building. The only help the builder should have is to be left to do the task alone. The other person should be gathering more fuel.
- Dry building materials are essential. Look under fir, cedar, pine or other evergreen trees for small dead branches. These branches, which should be brittle and snap like a wooden match would if you broke it in two, can be turned into tinder and kindling. The larger ones can be used for fuel.
- Always gather more fire building materials than you think you will need, especially fuel, during daylight hours. It will be a long night.
- Place a tire a couple hundred feet downwind from the vehicle. Let the air out of the tire by making a small cut across the valve stem near the wheel. Failure to let the air out can result in a dangerous heat-induced explosion. To insure a good fire start, shave small slices of rubber from the tread. This is best done by wetting the knife blade with water (saliva and urine will also work). If the ground is wet, place the rubber shavings on a piece of aluminum foil. Place the foil close to the upwind side of the tire and light the shavings. Gather dry wood and keep it close by and ready to put on the tire as it burns down.

4. **Food and Water:** Without water a person may die in a few days, but may live for a month without food. However, hunger is not a comfortable experience. A small amount of food should be carried on every trip into the back country. A good food choice is lightweight, takes little water to digest, has a long shelf life and doesn't melt from body heat. Jelly beans meet all of these requirements. Most of us like a varied diet and jelly beans come in many delicious flavors. All food requires water for digestion.

   When water is in short supply, it is recommended that you do not eat. Water is the most important substance we consume. To safeguard good health and maximize your survivability, sip water throughout the day. Carry a water supply with you and a supply of titratable iodine water purification tablets. Otherwise, boil all water for ten minutes before drinking it. Do not eat snow as a water substitute. It requires 12 eight-ounce glasses of snow to equal one eight—ounce glass of water. Eating great amounts of snow over a period of time will lower your body temperature and increase the risk of hypothermia and frostbite. Snow should be melted before consumption. This can be done in a container over a fire. In cold climates drink the water warm. In snow country carry a wide mouth plastic water bottle as a canteen (the one-quart size is best). As water is consumed, add more snow. The container is best hung on a cord around the neck. Place the container under the outer clothing. Body heat will melt the snow.

Unfortunately, lost people do not realize they are becoming dehydrated, nor do they consider the associated dangers. The lost person is frightened, embarrassed and confused. Being lost or becoming involved in any outdoor emergency is the time for clear thinking and appropriate action. Neither is possible when the person is dehydrated. Dehydration also predisposes cold injuries, the most serious of which are hypothermia and frost-bite. The smart survivor will avoid these injuries at all costs. When water is in short supply or unavailable, the ***water transpiration bag*** surpasses all other methods. All that is needed is a heavy duty clear or opaque plastic bag and cord. As a water producer in dry, semi-dry or desert environments, it may take up to 3 bags to sustain one survivor. When selecting foliage to be bagged, sample a leaf for taste. All foliage will have their own taste and some may be bitter. Select one you can stomach.

Water transpiration bag

Water Transpiration Bag Instructions:

- Select broadleaf and woody bushes – not plants.
- Additional leaves or foliage can be placed in the bag.
- Make a tight seal at the bag opening.
- Anchor the bag by tying to a log or rock.
- Place the bag where it will not be shaded from the sun.
- **CAUTION:** *DO NOT* use poisonous/toxic plants in transpiration bags.

5. **Shelter:** A water and windproof foil **space blanket** is a shelter that weighs no more than four ounces, measures approximately 56" x 84" and can be carried in the pocket. It is credited with saving at least two lives. These versatile blankets can be put to a number of uses. A seat will be needed inside the shelter and can be constructed from a pack, a pile of fir boughs or any material that will insulate the person from the wet or cold ground. While sitting on the pack with the back to the wind, wrap the blanket (foil side next to the body) over the head and around the body. Secure the blanket around the body with plastic camper's clothes-pins. These pins will secure the blanket except in extremely windy conditions. The wrap-around shelter only offers protection from the wet and wind and provides no insulation, so it is important to dress appropriately. Do not let the blanket touch bare skin or it will rapidly rob the body of heat. An insulating layer of clothing between the skin and the foil inhibits cooling. Staying dry and keeping the cool air out increase your chances for survival.

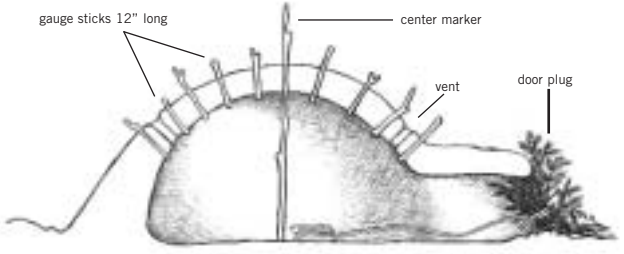
Shelters you can build:

Numerous people have survived a night in the worst of weather by staying by a fire. Survival is the maintenance of body heat, but what happens if there are not materials available for building a fire? A shelter from the wet, wind and cold is mandatory. The environment will dictate the type of shelter that should be built. When above the tree line, in snow country or on the arctic ice pack, snow becomes the shelter building material of choice. Always carry snow shelter building tools, an expedition snow shovel and saw, when in these areas.

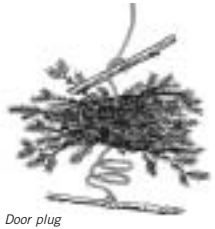
Quinzees: The quinzee is a snow dome that can be constructed without deep or hard-packed snow. Its dimensions, materials for construction and procedures follow. The size can vary, but a good size to start with is a mound of snow about 6 feet high and 12 feet in diameter; this is adequate for three or four campers. To construct a quinzee, you will need one pole about 8 feet long (this is the guide pole for the center) and 30 or 40 sticks about 1 foot long (these are the gauge sticks for the thickness of the roof). You will also need a shovel.

Follow these steps to construct a quinzee:

1. Find a good area with lots of snow.
2. Lay out your location and place the center pole in the snow.
3. Take the stout staff and stir the snow in your "quarry" area. Stirring the snow breaks down the structure and helps it hold together. Stir an area of about 6 or 8 feet in diameter and then start piling this snow around the center post. Continue this procedure until you have a mound about 6 feet high and 12 feet in diameter. This takes quite awhile and is the easy part.
4. Let the mound settle. This usually takes an hour or two.
5. After the mound has settled, carefully put in your gauge sticks.
6. Now comes the moment of truth. You start to dig out the entrance. A 24-inch thick hole is just about right. If the entrance remains firm, continue to scoop out the inside, using the gauge sticks to keep the thickness to 1 foot. Change diggers often to avoid overheating.
7. Pile the excavated snow around the entrance to form a wind-break. Make a door plug using evergreen boughs. The door plug is made by tying a cord approximately six feet long to the center if a stick about an inch in diameter and a couple of feet long.



Quinzee



Door plug

Place the stick with the cord coiled, on the ground. Pile evergreen boughs on top of the stick and cord at least two feet high. Reach down through the center and pull the cord up through the boughs. Place a second stick on top of the boughs and press down on the pile firmly. Wrap the cord around the second stick and tie it off. There should be several feet of cord remaining. Set your door to the side of the doorway and pull the cord inside the quinzee. To close, pull the door plug to the center and into the doorway. When boughs are scarce, a snow block will have to be used to close the doorway.

8. When you have finished the inside, be sure to make vents (usually two or three work best). Let the shelter stay open so the snow will harden.
9. After the shelter is hardened, you can move in.

Courtesy Sandy Bridges, Natural Boy Scout High Adventure Base; Ely, Minnesota.

"T" Snow cave shelter:

1. Begin against a slope

2. Crossways to entrance, then dig upward in all directions leaving sleeping floor flat

3. Downward about a foot

4. Cut entrance blocks and place across entrance

5. Fill cracks between blocks with snow

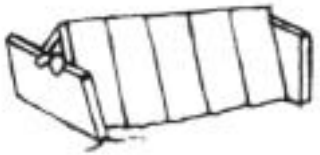
6. Cross-section of completed shelter

Snowblock shelter:

1. Cut blocks

2. Set blocks using staggered pattern, cover and chink cracks

3. Cover entrance with blocks



Cell Phones and Global Positioning Systems (GPS)

There is certainly a place for electronic devices in the arsenal of survival equipment. However, do not trust your luck or your life on them. Always have back ups and know how to use the signaling tools on pages 7–10 and carry a magnetic compass. Cell phones and GPS operate best in open areas and high ground. High mountains under the forest canopy and being positioned in deep canyons can limit their effectiveness. If unable to transmit or receive, move to a more likely area if possible.

Electronic Device Tips:

Cell phones, GPS and flashlight batteries are degraded by age, normal use, moisture, corrosion and cold temperatures. Always start out with fresh batteries and carry an extra set. Carry battery operated equipment in an inside pocket, close to your body to keep batteries warm and dry. Be certain that the area you are visiting is covered by your cell phone provider. Make a local check of your equipment at the trail head before leaving your vehicle.

A Word To The Wise

It has been estimated that more than 85% of the survival failures out there could have been prevented. The survivor's axiom – plan for the best, but prepare for the worst.

NOTES: _____

Suppliers:

Combat Trauma Wrap:
Speedhook Specialties Inc.
P.O. Box 11215 - G
Merriville, IN 46411
Phone/FAX 1-877-SPDHOOK

Other first aid supplies can be found in most pharmacies and/or department stores.